

# **Jamaica Bay Borrow Pit Evaluation Project**



# NY/NJ Harbor Dredged Material Management Plan

- Stop managing dredged material primarily as a waste
- Maximize use of Dredged Material (DM) as a resource
- Beneficial use – Ecological Restoration

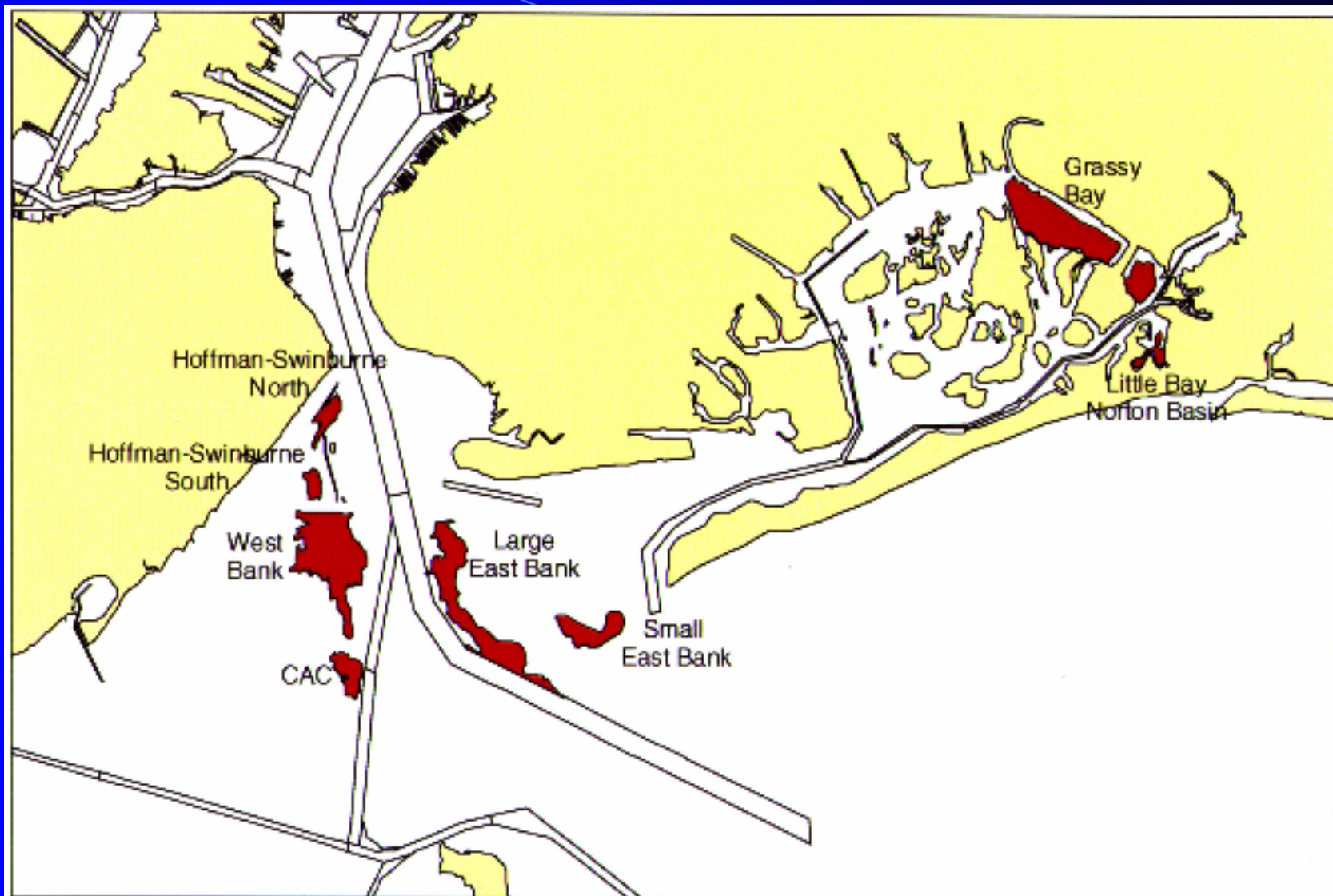
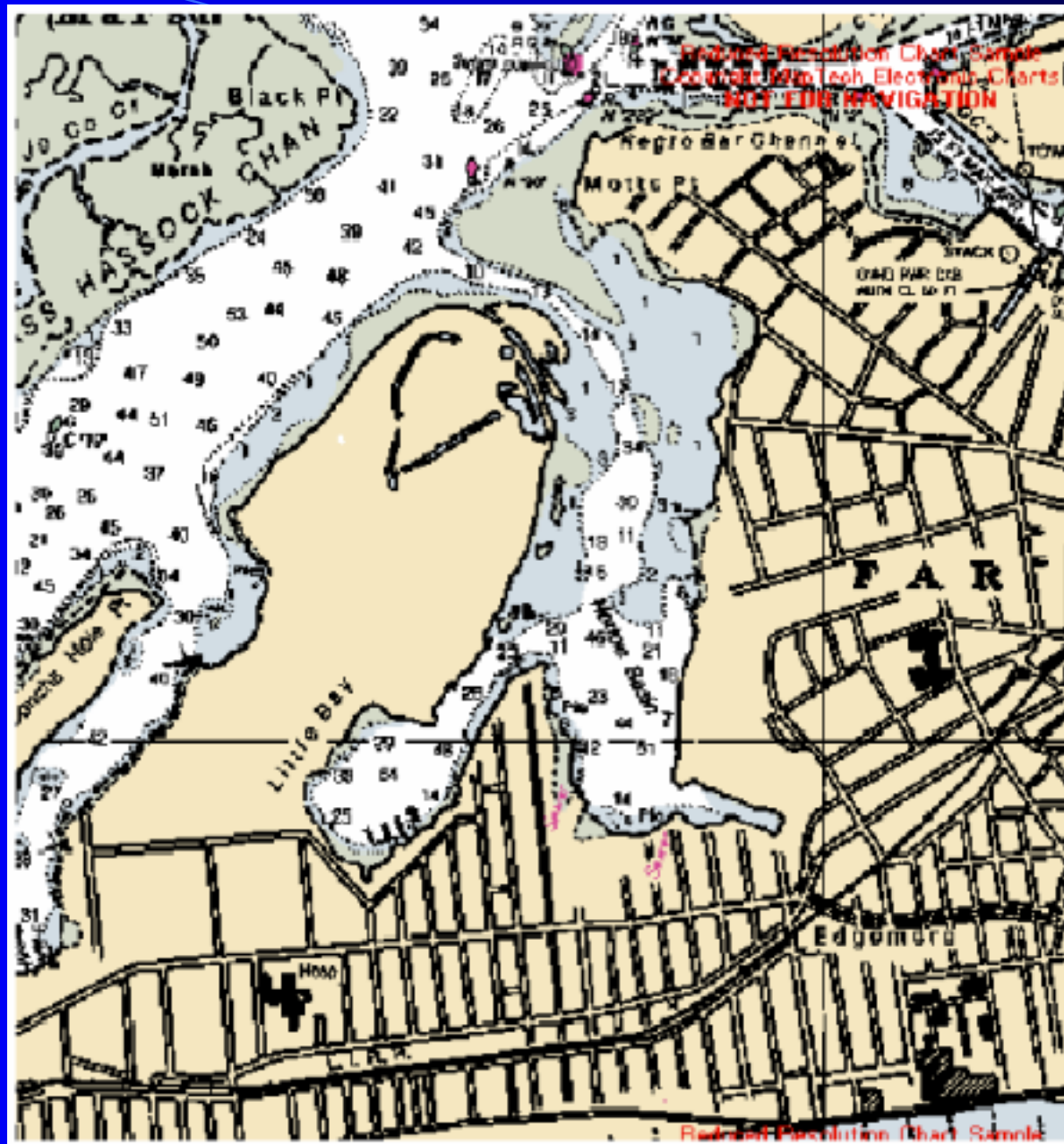






Figure 4.0.2. Topographic map of Norton Basin and Little Bay, 1899. U.S. Geodetic Coast and Geodetic Survey, 1877-1878.







Study Areas: Norton Basin & Little Bay Pits

Reference Areas: Grass Hassock Channel & The Raunt

	2 0 0 0	2 0 0 1						2 0 0 2						2 0 0 3
	Sept.	May	June	July	Aug.	Sept.	Oct.	May	June	July	Aug.	Sept.	Oct.	May
Bathymetry	X													
Side-Scan/Sub-Bottom Sonar	X													
Seabed Classification	X													
ADCP	X						X							
Gill Net/Trawl Survey	X		X				X	X	X		X			
Water Quality	X	X	X	X	X	X	X	X	X	X	X	X	X	
Sediment Characterization	X							X						
Benthic Community Survey			X				X		X				X	
SPI			X				X	X						
Bioassay/Bioaccumulation								X						X



# ADCP Tracklines

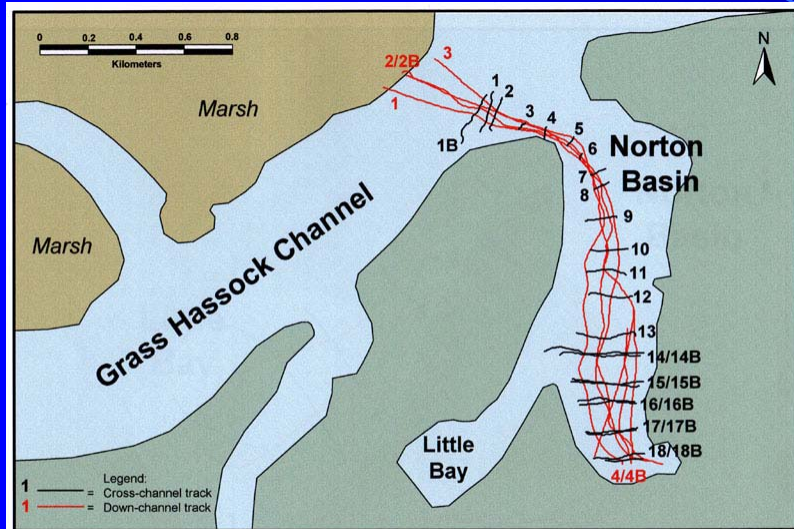


Figure 2-2. Actual Acoustic Doppler Current Profiler survey lines in Norton Basin.

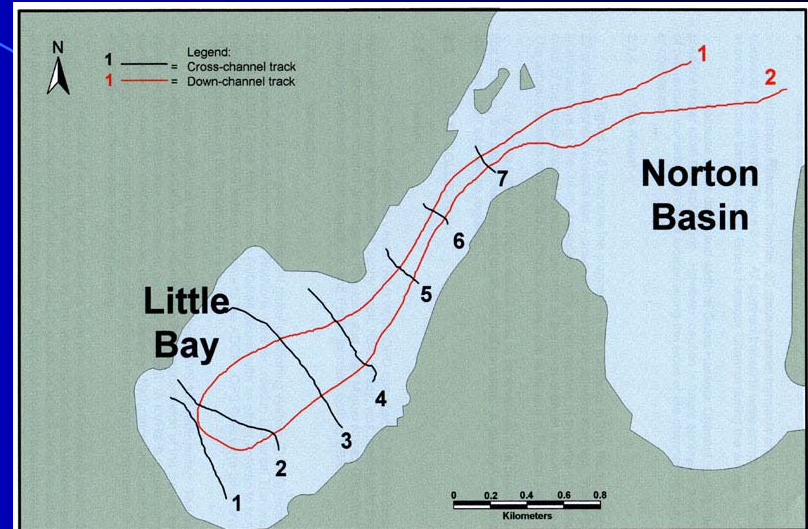


Figure 2-3. Actual Acoustic Doppler Current Profiler survey lines in Little Bay.

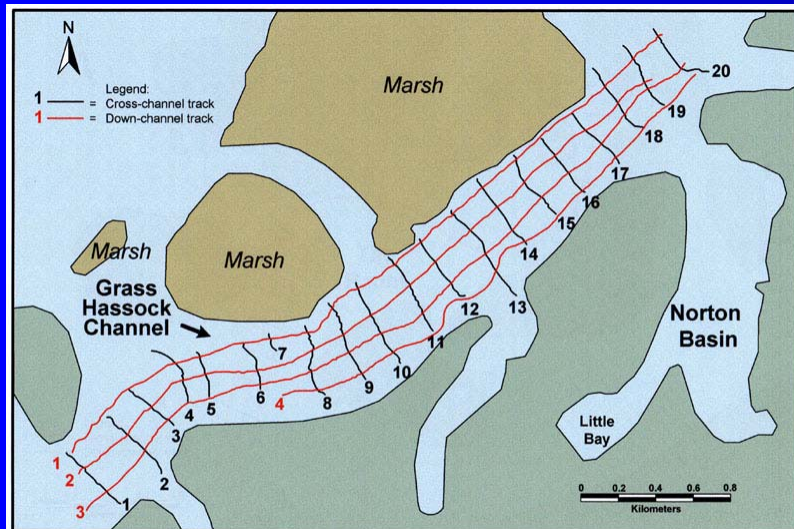


Figure 2-4. Actual Acoustic Doppler Current Profiler survey lines in Grass Haddock Channel.

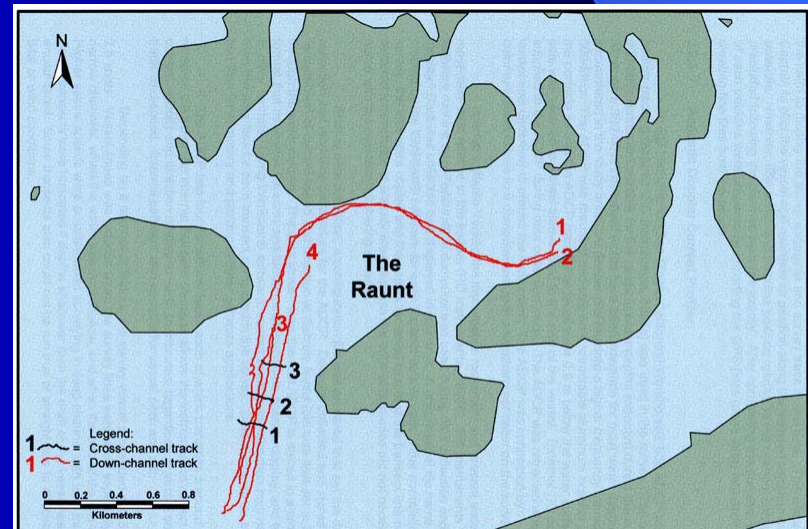


Figure 2-6. Actual Acoustic Doppler Current Profiler survey lines in The Raunt.



# Water Quality Monitoring

Depth Profiles (DO, Temp., Salinity)

Continuous Sensor packages (DO, Temp., Salinity, TSS, Current Speed/Direction)

Nutrient Analyses:

Dissolved

(N,  $\text{NH}_3$ ,  $\text{NO}_2/\text{NO}_3$ ,  $\text{PO}_4$ , TOC, Si)

Particulate

(C, N, P, Chl a, TSS)

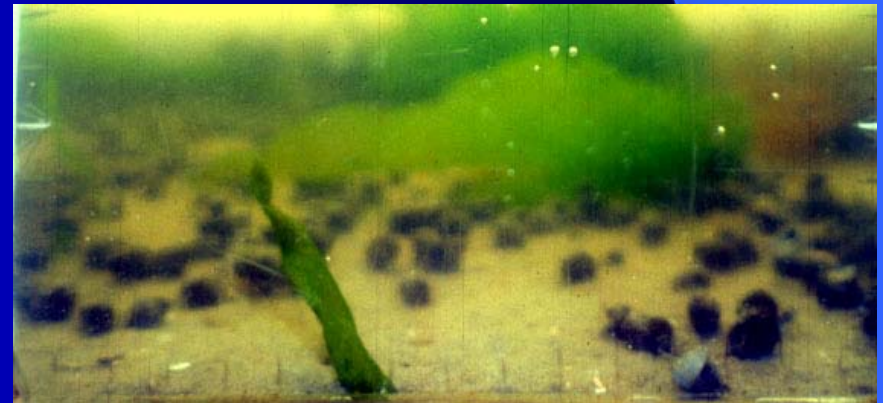


# Sediment Characterization/Contaminant Analysis





# Sediment Profile Imagery (SPI)







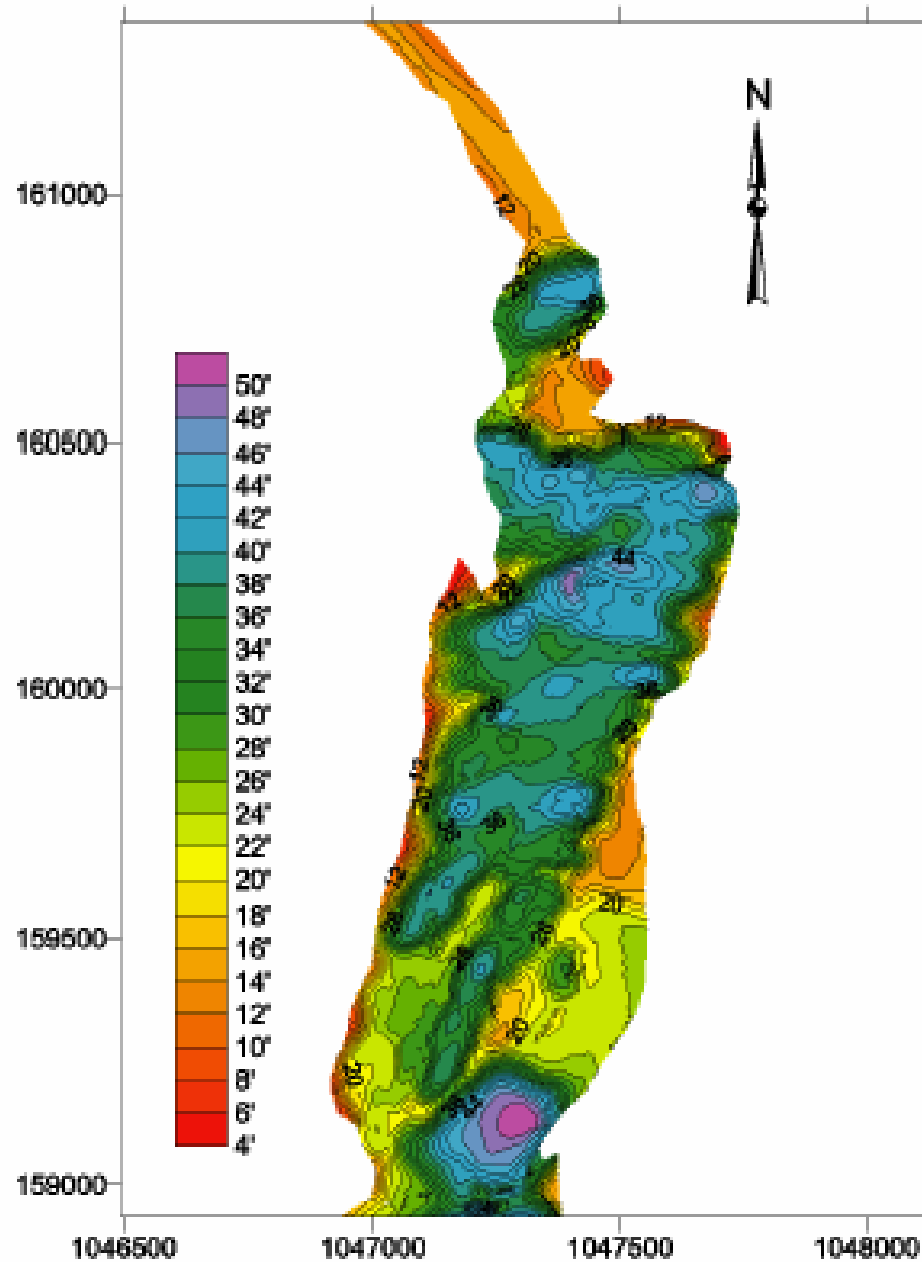


# Results & Findings

## Evaluation Panel

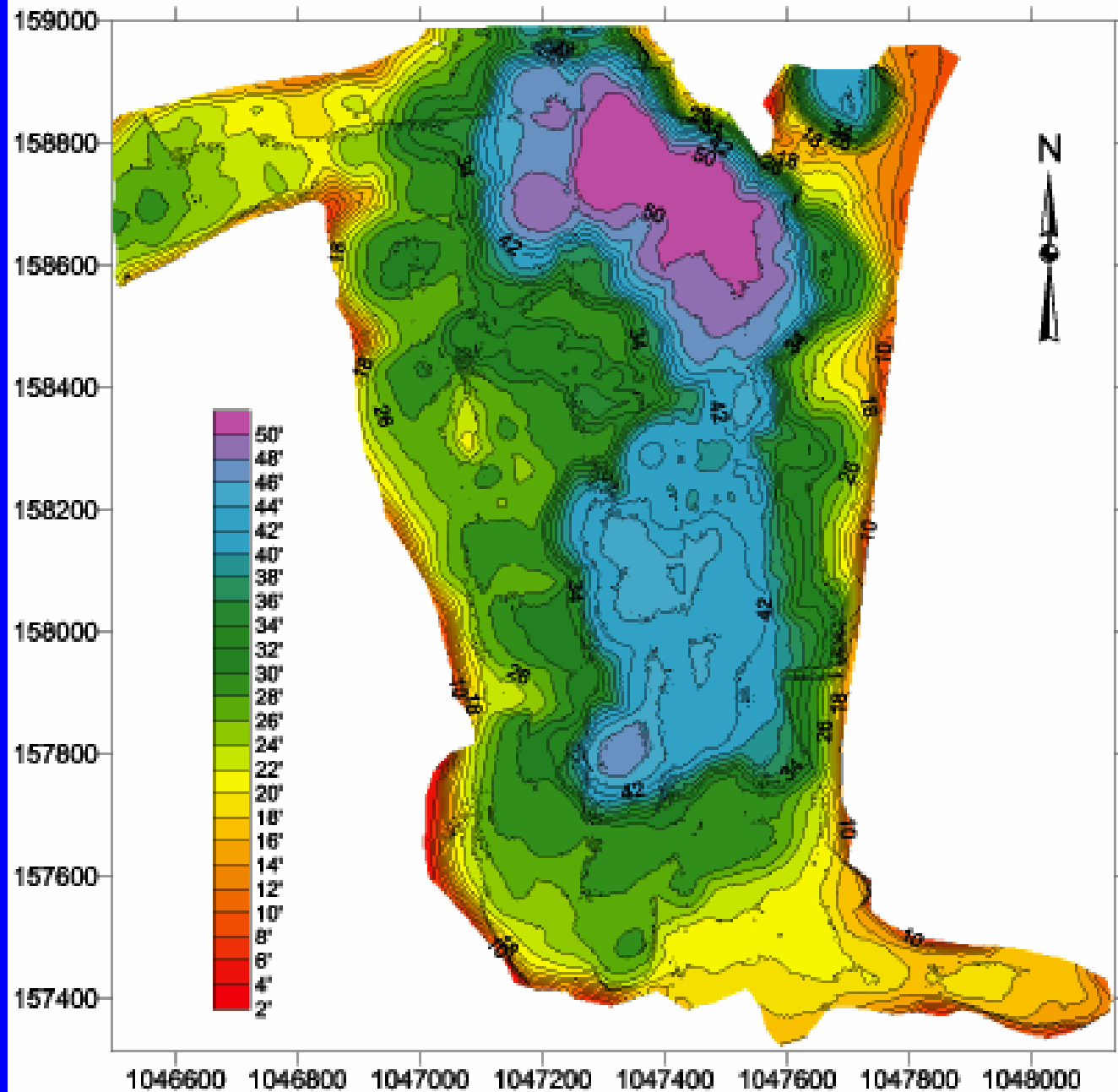
USEPA  
USACE  
NMFS  
USF&W  
NPS  
NYSDEC  
NYCDEP

# BATHYMETRIC MAP OF NORTON BASIN ENTRANCE CHANNEL

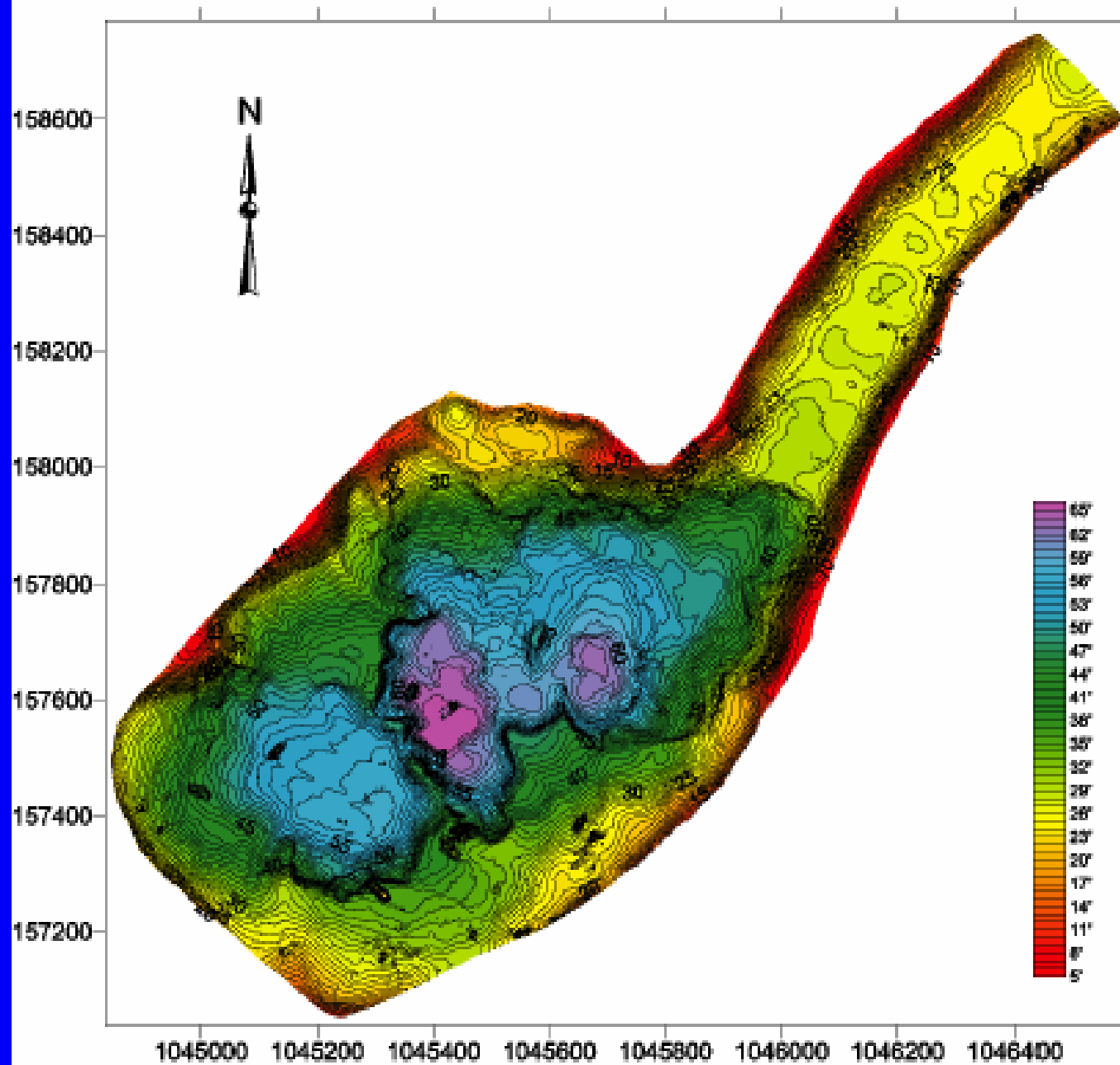




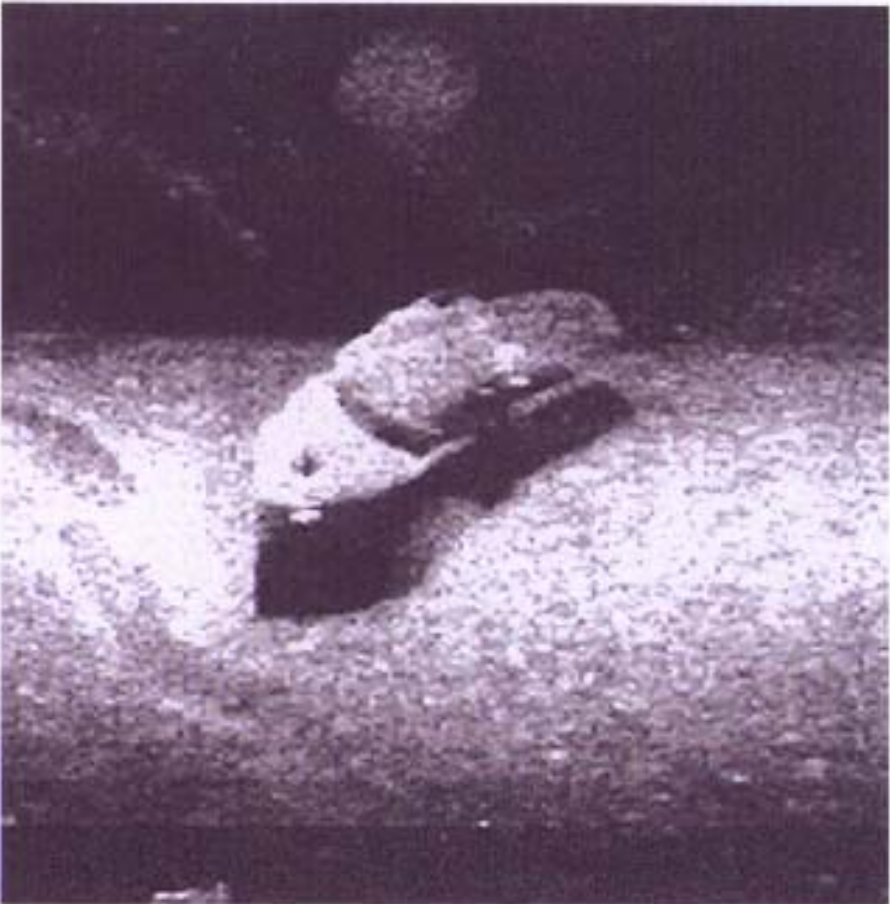
# BATHYMETRIC MAP OF NORTON BASIN



# BATHYMETRIC MAP OF LITTLE BAY







# Currents

- Generally slow (1-5 cm/s) in pit areas
- Flow patterns complex and poorly tied to tidal changes
- Basin morphology a likely factor

# The Raunt



Photo ra13 Sand and shell with hermit crabs



Photo ra14 Amphipod mat



Photo ra15 Shell bottom transition to sand



Photo ra16 Sand, patchy amphipod mat, hermit crabs





# Grass Hassock



Photo gh9 Amphipod mat with algae



Photo gh10 Amphipod mat with quahog



Photo gh11 Sand bottom, shell hash

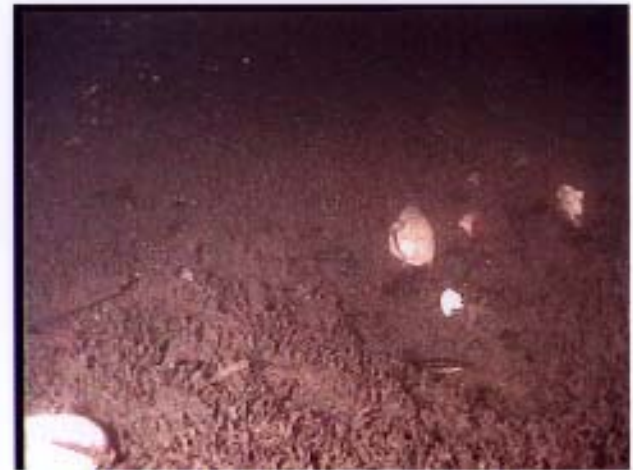


Photo gh12 Amphipod mat with quahogs







# Little Bay



Photo 1b1 Soft black mud bottom



Photo 1b2 Black mud with dead ulva



Photo 1b3 Black mud with dead ulva



Photo 1b4 White bacterial mat on black mud



# Norton Basin



Photo nb1 Black mud with shell hash



Photo nb2 Black mud with algae



Photo nb3 Black mud and live *Ulva*

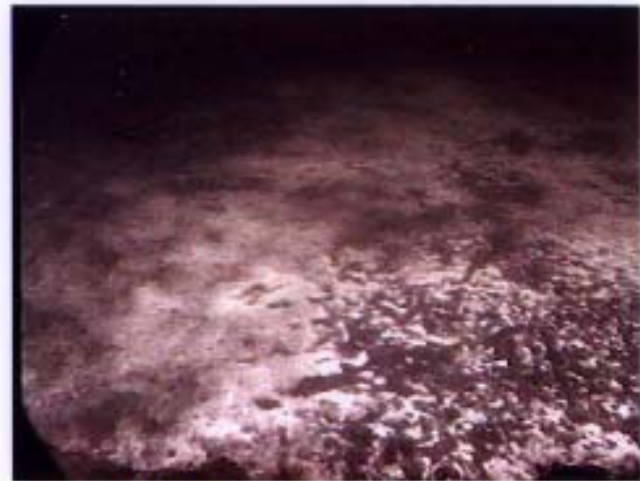
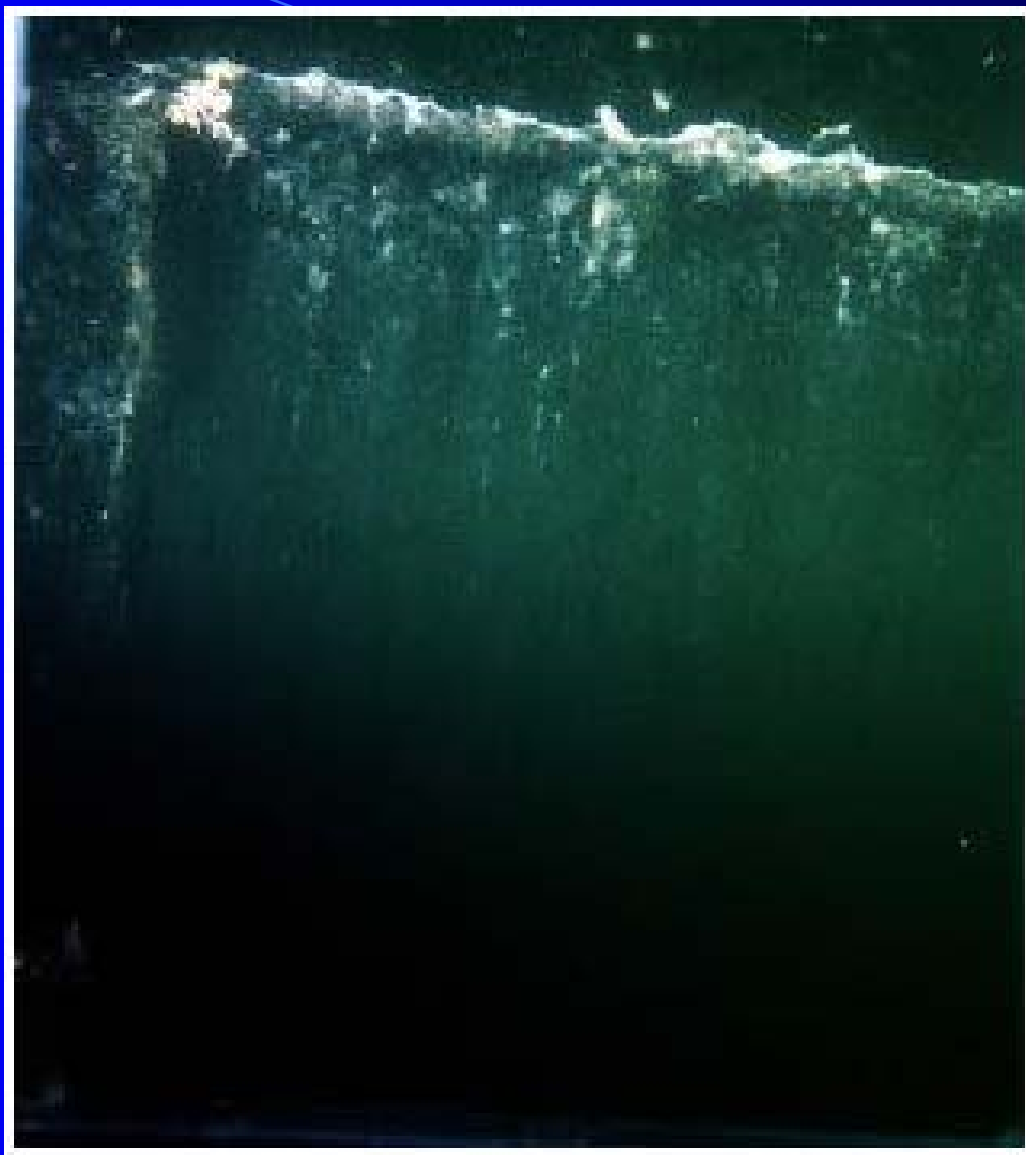
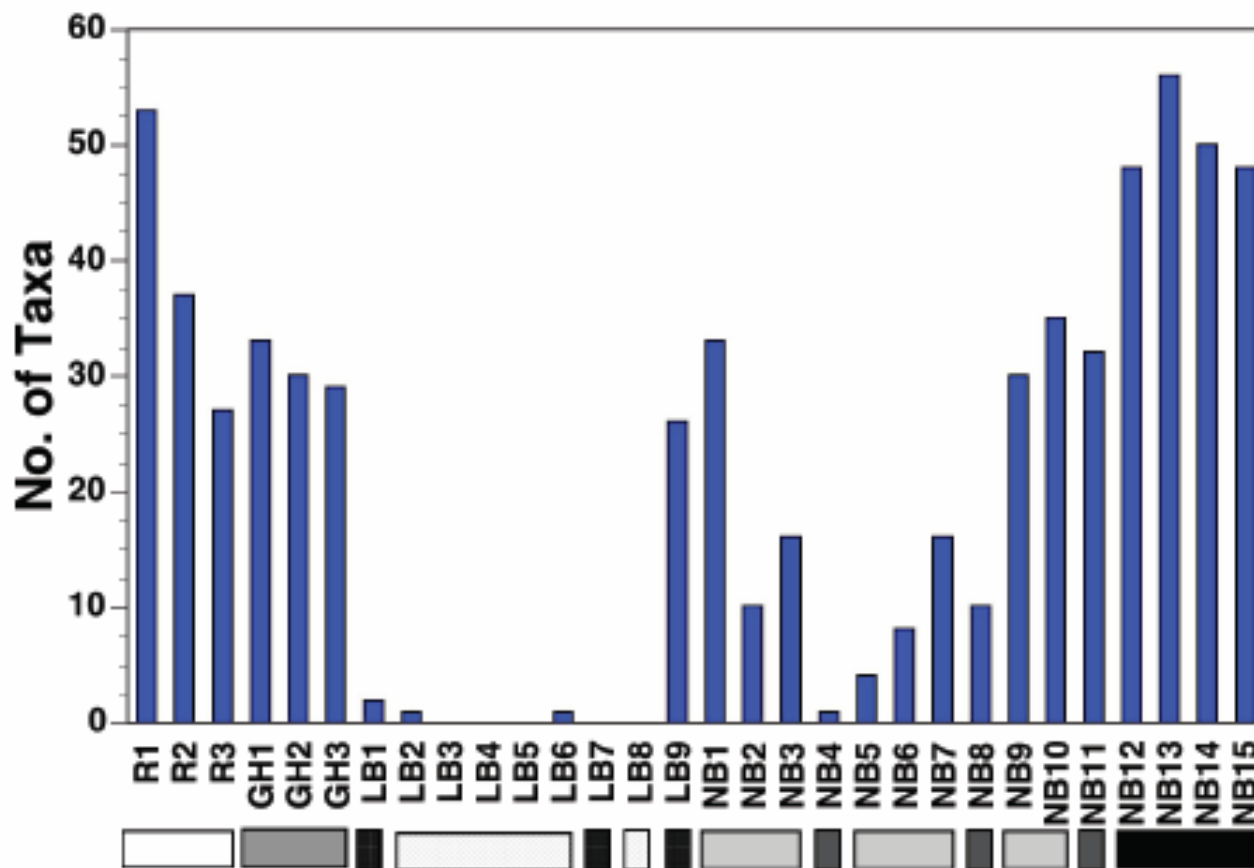


Photo nb4 Bacterial mat on black mud







- |  |   |                                 |
|--|---|---------------------------------|
|  | The Raunt.....  | R1 - R3                         |
|  | Grass Hassock Channel.....  | GH1 - GH3                       |
|  | Intermediate depth stations (approx. 30 ft.) in Little Bay.....     | LB1, LB7, LB9                   |
|  | Deep stations (over 40 ft.) in Little Bay.....                      | LB2 - LB6, LB8                  |
|  | Intermediate depth stations (20 ft. to 35 ft.) in Norton Basin..... | NB1 - NB3, NB5 - NB7, NB9, NB10 |
|  | Deep stations (over 40 ft.) in Norton Basin.....                    | NB4, NB8, NB11                  |
|  | Norton Basin entrance channel.....                                  | NB12 - NB15                     |





# Finfish & Crustaceans

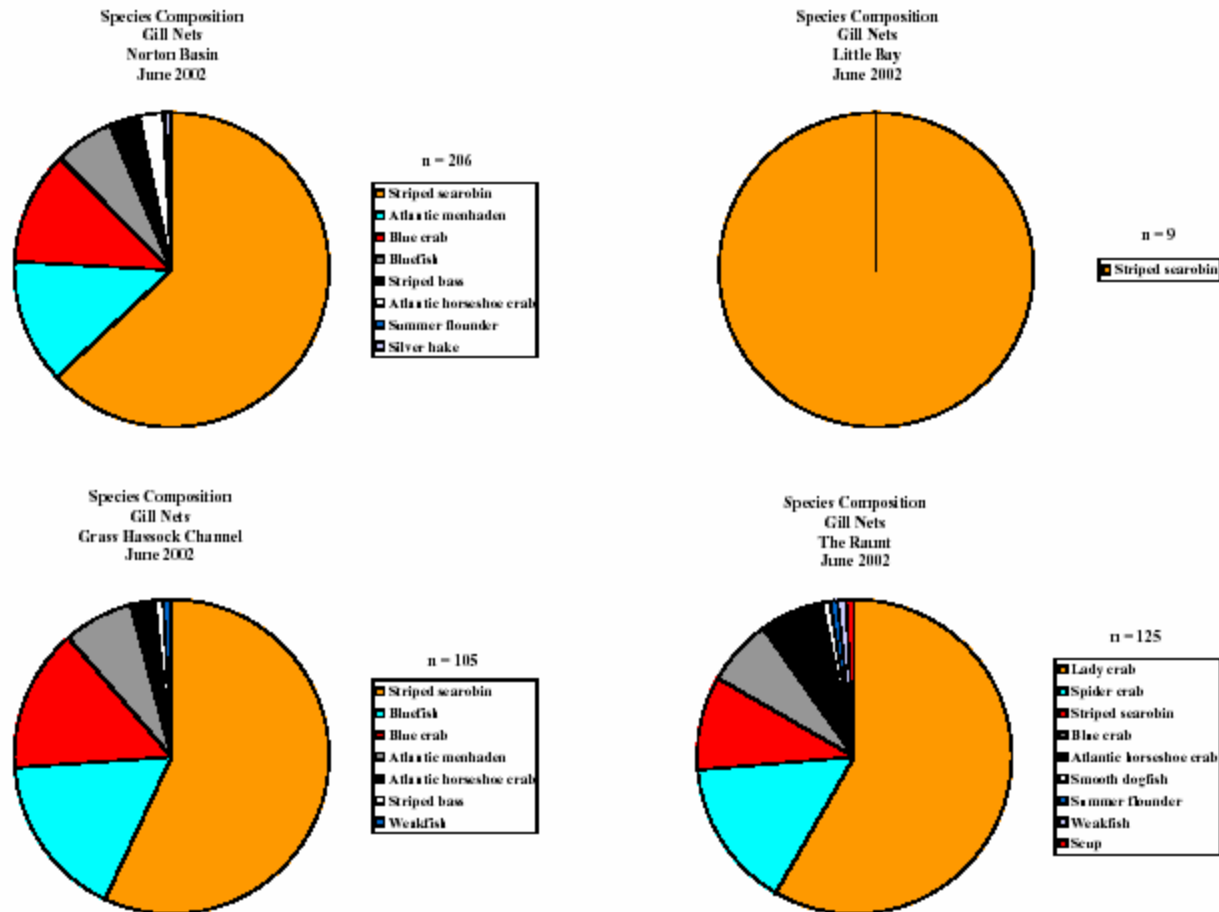


Figure 4.2.2.1 Species composition from gill net sampling efforts, June 2002.

# Water Chemistry

- LB Pits very different compared with NB Pits and reference stations
  - High sulfide, ammonium, phosphate & dissolved silica
  - Low nitrate/nitrite, biogenic silica & chlorophyll/phaeophytin
  - High rate of decomposition in LB

# Sediment Chemistry

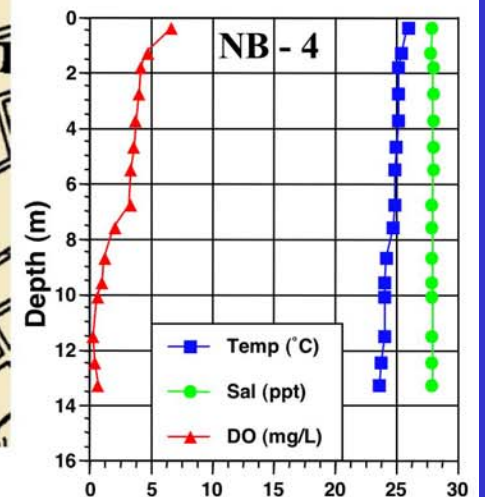
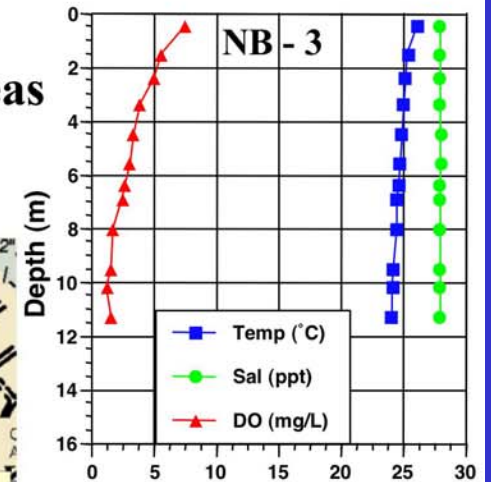
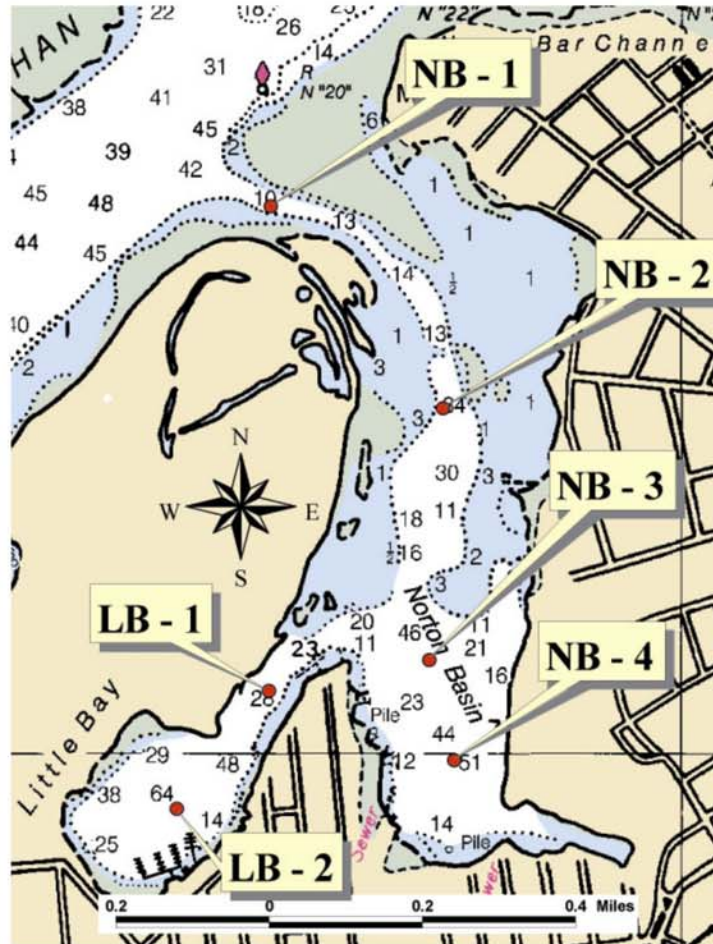
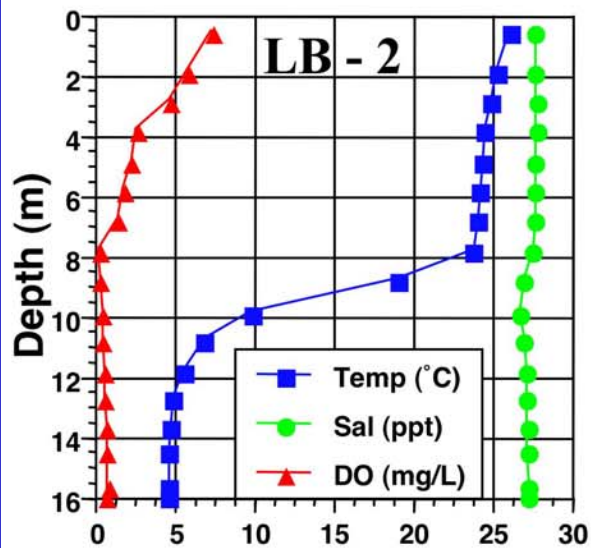
- Generally lower bulk concentrations than expected
- NB & GH - 1 analyte >ER-M
- LB – 6 analytes > ER-M



# Bioassay

- **Whole sediment**
  - No acute toxicity
  - Lower survival of *E. estuarius* in LB
- **Elutriate phase**
  - No acute toxicity
  - Normal mussel larvae development
- **Bioaccumulation**
  - PCBs, metals, dioxin, naphthalene, heptachlor present
  - All below guidance levels

# Water Quality Profiles Norton Basin/Little Bay Study Areas July 25, 2001



# Findings Statement

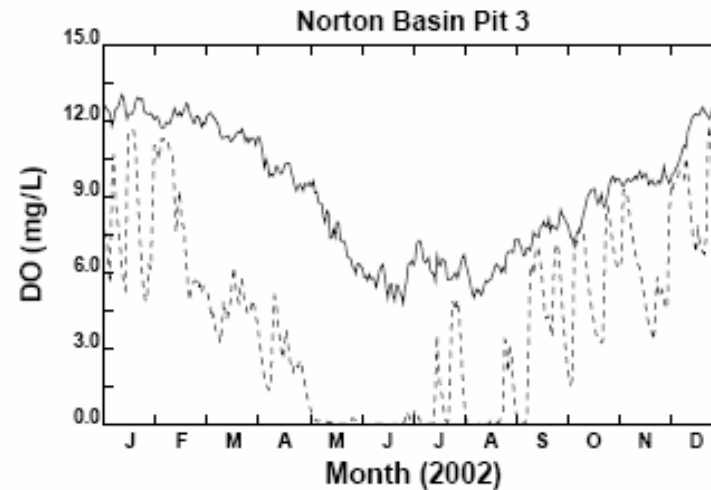
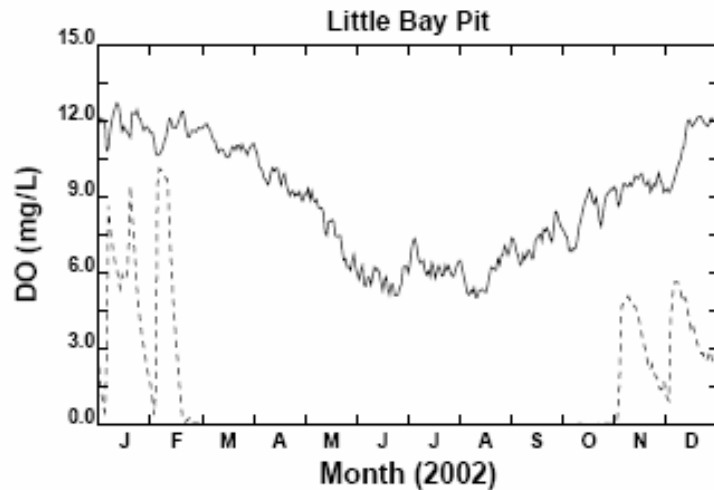
- LB Pits – Substantially Impaired
  - Persistent hypoxia/anoxia
  - Poor sediment & water quality
  - Depauperate benthic & finfish community
- NB Pits – Impaired
  - Seasonal hypoxia
  - Poor sediment quality
  - Significantly reduced benthic community



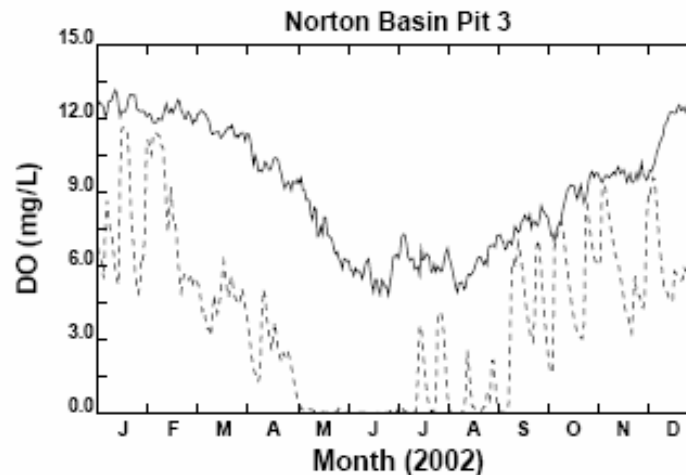
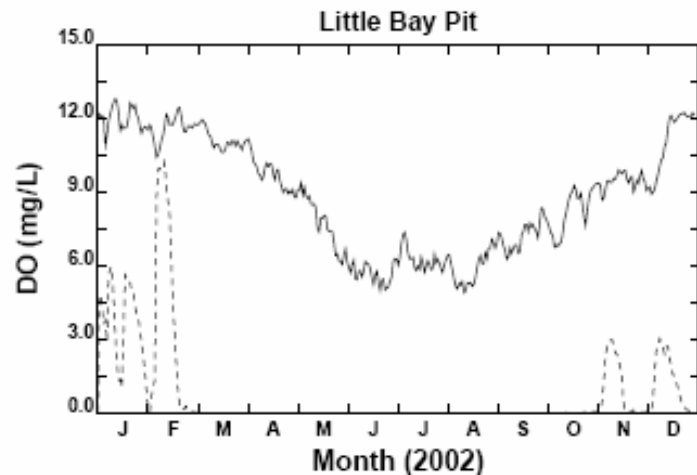
To view the project reports and the Findings Statement go to:

<http://www.dec.ny.gov/lands/7187.html>

# Hydrodynamic & Water Quality Modeling Results: Dissolved Oxygen Changes

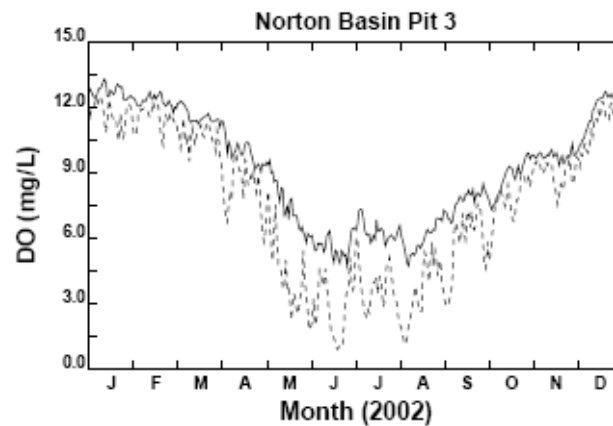
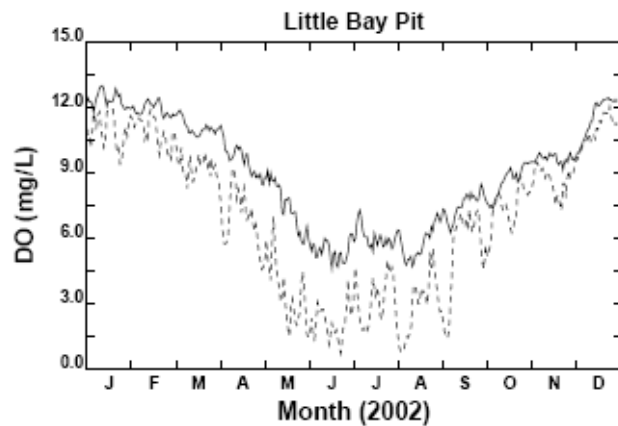


**Baseline  
Conditions**

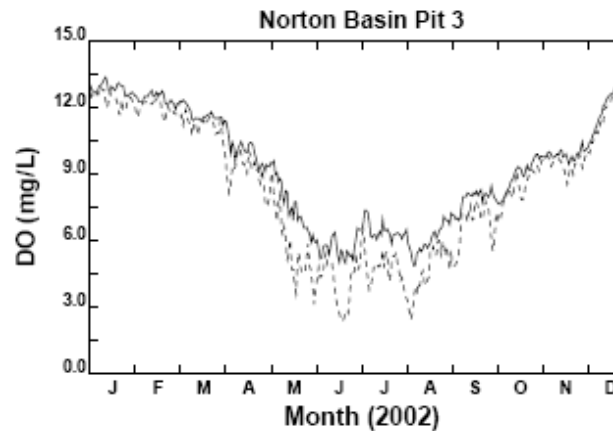
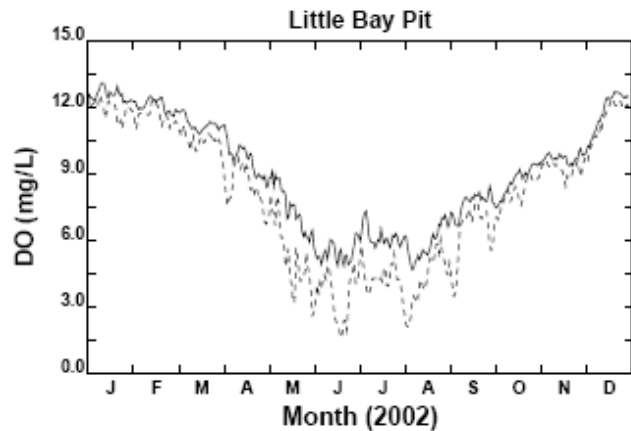


**Dredging  
Entrance  
Channel  
Only**

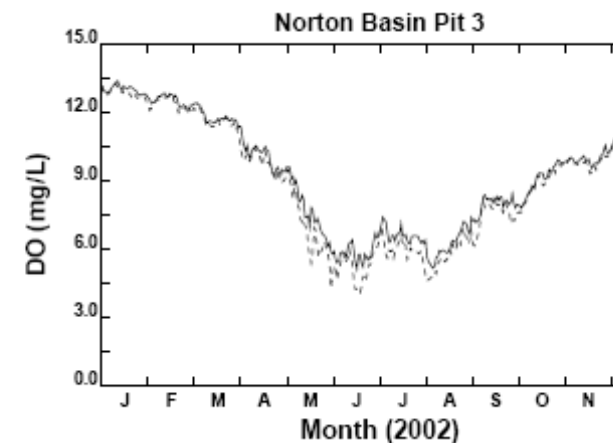
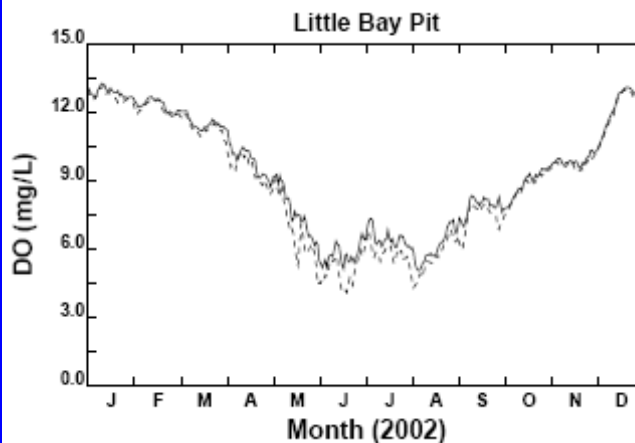
— Model Surface (Avg.)  
- - - Model Bottom (Avg.)



**Dredging  
Entrance  
Channel  
And Filling to  
-26 ft**



**Dredging  
Entrance  
Channel  
And Filling to  
-20 ft**



**Dredging  
Entrance  
Channel  
And Filling to  
-13 ft**



# What's next...

- Review alternatives to improve conditions
- Project Design
- EA / Permitting / Public Review